MACROSIPHONIELLA LEUCANTHEMI (HOMOPTERA: APHIDIDAE): NEW RECORDS AND REDESCRIPTIONS OF THE APTEROUS AND ALATE VIVPAROUS FEMALES[1]

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ABSTRACT: The known North American distribution of *Macrosiphoniella leucanthemi* is expanded from Pennsylvania and Oregon to include Maryland. Redescriptions of apterous and alate viviparous females are provided along with illustrations. A key to the aphids on chrysanthemums in the United States is modified to include *M. leucanthemi*.

The genus *Macrosiphoniella* Del Guercio (sensu stricto) is comprised of 87 species worldwide (Remaudière and Remaudière 1997). The number of North American species referable to the genus is much less (Russell 1967, Smith and Parron 1978, Robinson 1987). Of the 16 species known from North America (Robinson 1987), ten also occur in Europe. Members of the North American *Macrosiphoniella* are distinguished from other similar genera (e.g. *Dactynotus*, *Macrosiphum*, and *Sitobion*) by the presence of three setae on tarsal segment I, an ultimate rostral segment that is often stiletto shaped with the longest hairs on the basal half, scleroites that are often developed around the dorsal abdominal setae, a presiphuncular sclerite that is usually present, and apical reticulations that usually occur on more than one third of the length of the cornicles (Robinson 1987). Additional recognition characters include an elongate, blunt cauda in some species and the aphid's association with Asteraceae (= Compositae) (Foottit and Richards 1993).

Macrosiphoniella leucanthemi (Ferrari) was originally described in 1872 from Europe, but there apparently were no subsequent collections of the aphid for nearly 70 years (Hille Ris Lambers1939). Hille Ris Lambers (1939) provided a brief redescription and a modified key of the European *Macrosiphoniella* to include *M. leucanthemi*. Known distribution of *M. leucanthemi* in North America was previously limited to two counties in north-central Pennsylvania (Pepper 1965) and one site in western Oregon (Jensen 1992). Although abbreviated descriptions of *M. leucanthemi* have been provided (Ferrari 1872, Hille Ris Lambers 1939), corresponding morphological illustrations have not been published.

In this paper, we include an additional distribution record for *M. leucanthemi* and provide illustrations and redescriptions of the apterous and alate vivipa-

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rous females. Annotated keys based on Miller and Stoetzel's (1997) work on aphids associated with chrysanthemums in the United States are also included herein.

MATERIALS AND METHODS

Synoptic descriptions are based on original and subsequent descriptions, material from the Aphidoidea portion of the National Collection of Insects (USNM), Beltsville, Maryland, and the personal collection of Andrew S. Jensen (ASJC), Greenbelt, Maryland. Measurements are presented in microns (μ) as minimum and maximum ranges of representative specimens.

In **Specimens Examined**, alates and apterous adults are abbreviated as "al." and "ap. ad." respectively. For specimens collected at the same locality, on the same date, and from same host plant as previously listed, the duplicate information is not repeated. Unless otherwise noted, voucher material consists of a single slide (sl.). Information included within brackets ([ ]) has been added by the present authors for clarification purposes.

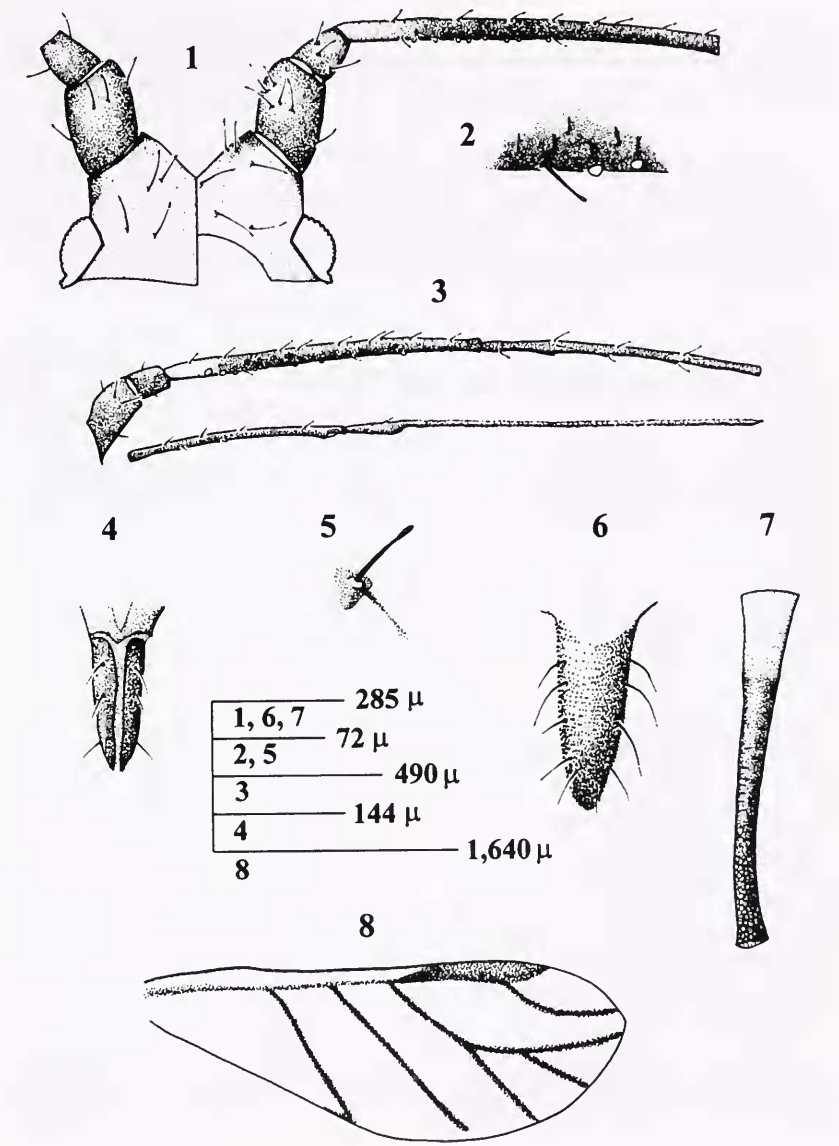
Macrosiphoniella leucanthemi (Ferrari)

Figs. 1-8

Siphonophora leucanthemi Ferrari, 1872:214.
Macrosiphoniella leucanthemi (Ferrari); Hille Ris Lambers, 1939:115-117.
Macrosiphoniella leucanthemi (Ferrari); Pepper, 1965:205.
Macrosiphoniella leucanthemi (Ferrari); Robinson, 1987:916.
Macrosiphoniella leucanthemi (Ferrari); Jensen, 1992:218.

Field Characters.- Apterous viviparous females, green with dark bands through eyes to "dark cream green" or "green - black dots" (USNM slide data) to yellowish green with darker green to reddish brown bar between the cornicles (Hille Ris Lambers 1939). Ferrari (1872, in Latin) described the "apterous female" as yellowish-green with red eyes; antennae dark with basal third pale, antennal tubercles dark; cornicles dark; cauda pale yellow; legs pale but femora, apex, and basal third of the tibiae dark. We add from observations of living specimens that the lateral margins of head and prothorax are deeper green and the last rostral segment is dark. Alate viviparous females similar in coloration to apterous viviparous female except green with red eyes (USNM slide data) and abdomen with small, distinctive marginal scleroites (Hille Ris Lambers 1939); abdomen of the "alate female" in Ferrari's (1872) description differs from the apterous female by having the head brownish-black, the thorax dark, and the wing veins dark with "first and second oblique" veins with dark margins.

Recognition Characters from Slide-mounted Specimens.- Apterous viviparous female (Figs. 1-2, 4-7): Body length 2,220-3,924; width through eyes, 492-624. Antennae longer than body, dark except base of III pale; length segment III, 492-624 with 10-21 secondary sensoria on basal 2/3, sensoria restricted to approximately half the circumference of the segment; length of IV, 816-1,044; V, 528-624; length of base of VI, 156-192; length of terminal process, 852-948. Setae capitate; head capsule setae nearly twice as long as basal width of antennal segment III. Rostrum extending to hind coxae; rostral segment III usually with 6 pairs of setae; length of ultimate segment (Fig. 4), 132-156, with 6 accessory setae, subequal to hind tarsal segment II. Length of hind tibia, 1,716-2,244; hind tarsus II, 120-144. Abdomen smooth with small spicules, dorsal abdominal setae usu-



Figures 1-8. 1, dorsal and ventral aspects of head capsule of apterous adult female; 2, enlargement of antennal sculpturing, seta, and secondary sensoria; 3, antenna of alate adult female; 4, ultimate rostral segment; 5, dorsal abdominal seta with basal scleroite; 6, dorsum of cauda; 7, cornicle; 8, forewing.

ally associated with a basal scleroite (Fig. 5); setae of abdominal tergite VIII nearly twice the basal width of antennal segment III. Comicles (Fig. 7) dark, pale basally, gradually tapering then slightly expanded apically, apical $^1/_3$ with polygonal reticulation; length, 780-960. Length of cauda (Fig. 6), 336-468, pale, spinulose, elongate triangular, usually with 4-5 pairs of lateral setae and 1-3 preapical setae.

Alate viviparous female differing from apterous viviparous female as follows: Body length, 2,460-3,000; width through eyes, 516-564. Length of antennal (Fig. 3) segment III, 840-1,092, with 42-55 secondary sensoria; IV, 672-888; V, 576-708; length of base of VI, 168-204; terminal process, 924-1,080. Length of ultimate rostral segment 132-156. Length of hind tibia, 1,720-2,340; hind tarsus II, 120-156. Lateral sclerite large, subequal to basal width of cornicles. Length of cornicles, 768-936; cauda, 324-360, with 3-5 pairs of lateral setae and 2-3 preapical setae. Length of forewings, 3,240-3,360; hindwings 1,740-1,980; wing veins dark with fuscous border (Fig. 8).

Remarks.- The most recent collections of *M. leucanthemi* were from sites that included a concentration of ox-eye daisies, *Leucanthemum vulgare* Lam. (=*Chrysanthemum leucanthemum* L.), in the western Oregon Cascade Mountains (Jensen, 1992 and pers. com.) and from *L. vulgare* in a wildflower demonstration plot in Beltsville, Maryland. The initial collection of *M. leucanthemi* in Oregon came from heavily infested plants with aphids covering the stems (Jensen, pers. com.); however, additional collecting trips in subsequent years did not produce *M. leucanthemi* from areas adjacent to the original collection site (Jensen, pers. com.). Maryland specimens of *M. leucanthemi* also were not abundant or readily observable on their host plants. Specimens were detected only after host plants were tapped over a wooden collecting board (Jensen, pers. com.) or after of the bases of numerous flowers were examined carefully.

Specimens Examined.-U.S.A.: MARYLAND, Beltsville, on *C. leucanthemum* [=*L. vulgare*], A. Jensen collector, USNM: IV-29-1997 (2 ap. ad.), V-5-1997 (1 ap. ad.), V-14-1997 (1 al. ad.), V-20-1997 (1 al. ad. and 6 ap. ad. on 2 sl.), VI-17-1997 (8 ap. ad. on 2 sl.); G.L. Miller collector, USNM: V-4-1998 (1 al. ad.), V-13-1998 (2 ap. ad. on 2 sl.).

OREGON: Linn Co., Andrew's Forest, on *C. leucanthemum* [=*L. vulgare*], A. Jensen collector, ASJC: VI-19-1991 (1 al. ad. and 1 ap. ad. on 2 sl.).

PENNSYLVANIA: State College, on shasta daisy (Pepper's (1965) paper listed "*Chrysanthemum leucanthemum* var. *pinnatifidum*" as the host. It is possible that the identification "Shasta Daisy," as recorded on the microscope slide, was mistaken for ox-eye daisy and corrected in the publication.), J. O. Pepper collector, USNM: X-8-1948 (6 ap. ad. ♀ on 2 sl.); Red Rock, Rickett's Glen, on *C. leucanthemum* [=*L. vulgare*], J. O. Pepper collector, USNM: VIII-30-1950 (1 al. ad. ♀); State College, on *C. leucanthemum* [=*L. vulgare*], J. O. Pepper collector, USNM: VII-21-1962 (9 ap. ad. ♀ on 2 sl.).

The key included in Miller and Stoetzel's (1997) paper to apterae (= wingless adult females) colonizing chrysanthemums in the United States can be modified as follows to include *M. leucanthemi*:

11. Cornicle either completely pale, pale with dark tips, pale basally with remainder dark, or completely dark; cauda pale 12
Cornicle dark; cauda dark or dusky 14
12. Dorsal abdominal setae pointed or capitate; cornicle with rows of reticulations or striations below apex 12A
Dorsal abdominal setae fan shaped; cornicle without rows of reticulations or striations below apex ..... *Pleotrichophorus chrysanthemi* (Theobald)
12A. Most dorsal abdominal setae associated with basal scleroite; cornicle with approximately 1/3 polygonally reticulated apically ... *Macrosiphoniella leucanthemi* (Ferrari)
Dorsal abdominal setae not associated with basal scleroite; cornicle with much less than 1/3 polygonally reticulated apically .....
..... (continue at 13 in Miller and Stoetzel's 1997 key)

The key included in Miller and Stoetzel's (1997) paper to alatae (= winged adult females) colonizing chrysanthemums in the United States can be modified as follows to include *M. leucanthemi*:

7. Cornicle with apical reticulations less than 1/3 of length, slightly constricted in region of apical reticulation ..... *Macrosiphum euphorbiae* (Thomas)
Cornicle with apical reticulations more than 1/3 of length, reticulated region not constricted 7A
7A. Wing veins bordered with fuscous pigmentation; cornicle pale basally .....
..... *Macrosiphoniella leucanthemi* (Ferrari)
Wing veins not bordered with fuscous pigmentation; cornicle completely dark .....
..... (continue at 8 in Miller and Stoetzel's 1997 key)

DISCUSSION

The ox-eye daisy, *L. vulgare*, native to Eurasia, originally came to America sometime after the first Europeans arrived. With the deforestation of eastern North America and subsequent clearing of the land for agricultural use, the daisy spread and eventually become a nuisance in open fields (Sanders 1993). At the height of the American agricultural era, "spring fields were as white as after a midwinter's blizzard" (Sanders 1993); hence its other common names, white weed or May weed (Durant 1976). Since its initial introduction, ox-eye daisy has become widely naturalized in North America. Although it is classified as a regional noxious weed in selected areas of British Columbia, Canada (Cranston et. al. 1996), it is not on the U. S. Federal noxious weed list (Anonymous 1995). Land development and the succession of many old fields to wooded habitats has resulted in the ox-eye daisy's becoming much less common in parts of the eastern United States (Sanders 1993). More recently, the ox-eye daisy has been used in plantings of wildflower meadows and is offered for sale in several seed catalogs for gardeners.

Recent collections of *M. leucanthemi* indicate that it is more widespread

than previously reported (Pepper 1965, Jensen 1992). Because ox-eye daisy may represent the only recorded host of *M. leucanthemi* in North America (Pepper 1965, Robinson 1987, Jensen 1992), and because this host is prevalent across much of the North America, *M. leucanthemi* might have a broader North American distribution. This aphid, however, may be variably abundant and heavy infestations encountered irregularly.

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